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INSECT REPELLENT COVERS
[Bochu kaba]

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Claims

1. Insect repellent covers characterized by the fact that by overlaying a front sheet made of an anterior piece and a posterior piece that have an overlap over a back sheet of the same shape as said front sheet and fusing the side edges and bottom edge of the two sheets while also forming the upper edge, including the upper ends of the above overlap, in an open bag-shape and spreading the overlap at the upper part of said front sheet to the right and left, [the covers] are configured to allow placement of the insect repellent cover on clothes without removing hangers hung with clothes from hanger bars, and in that a re-sealable means has been installed on a portion of the overlap at the upper part of said front sheet.

2. Insect repellent covers as described in Claim 1 characterized by the fact that the above front sheet is made of plastic, the back sheet is made of nonwoven fabric, and a mixture of pyrethroid insect-repellent components that are volatile at room temperature and insect-repellent components that are nonvolatile has been included in this nonwoven fabric back sheet as insect-repelling component.

3. Insect-repelling covers as described in Claim 2 characterized by the fact that the pyrethroid insect-repellent component that is volatile at room temperature is empenethrin and the nonvolatile insect-repellent component is silafluofen.

4. Insect-repelling covers as described in any of Claims 1-3 characterized by the fact that the sealing means that is installed on a portion of the upper overlap of the front sheet is a sealing material.

Detailed explanation of the invention

[0001]

Industrial application field

This invention pertains to an improvement of insect-repelling covers.

[0002]

Prior art

For insect-repelling covers in the past, products wherein plastic sheets containing insect-repellent components were formed into closed bags with holes at the top for protrusion of the hanger hooks, and those wherein the front sheets of these bags were divided into right and left pieces and door-shaped sheets were overlaid between them were known. However, in the previous insect-repelling covers, taking hangers of hung clothes in and out of insect-repelling covers could only be done by first removing the hanger from the hanger bar, and after inserting the hanger from the bottom end of the insect-repellent cover or door portion of the front sheet, protruding the hanger hook from the top; the procedure was tedious. And, for components of the insect-repellent, those of high volatility were generally used and were frequently contained in the plastic sheet for gradual release and complex manufacturing processes were unavoidable.

[0003]

Problems to be solved by the invention

This invention was made to present useful insect-repelling covers that satisfy all of the following: (1) convenience of allowing placement of the insect-repellent cover on clothes without removing hangers hung with clothes from the hanger bar, (2) long-term maintenance of superior insect-repellent effects, and (3) producibility.

[0004]

Means to solve the problems, and embodiments of the invention

Upon diligent research to solve the above problems, the inventors discovered that by giving the upper part of the front sheet an openable-and-closable configuration, preferably including insect-repellent components in the nonwoven fabric back sheet, and selecting as insect-repellent components mixtures of pyrethroid insect-repellent components that are volatile at room temperature and insect-repellent components that are nonvolatile, the desired insect-repelling covers could be obtained and realized this invention.

[0005]

That is, the invention of Claim 1 pertains to insect repellent covers wherein a front sheet made of an anterior piece and a posterior piece that overlap is overlaid on a back sheet of the same shape as said front sheet and the side edges and bottom edge of the two sheets are fused while the upper edge, including the upper ends of the above overlap, is formed in an open bag-shape. They are configured so that by spreading the upper overlap of said front sheet to the right and left, insect repellent covers can be placed on clothes without removing hangers hung with clothes from hanger bars. Also a re-sealable means has been installed on a portion of the upper overlap of said front sheet.

[0006]

The sheets used in the insect-repelling covers of this invention are made of plastic or nonwoven fabric. It is preferable that the front sheet in which the anterior piece and posterior piece overlap be made of plastic. As plastic sheet materials, polypropylene, polyethylene, ethylene-vinyl acetate copolymer, etc., can be cited. But they are not limited to these. They can be used as single sheets or laminated with

nonwoven fabric sheets. Meanwhile, for nonwoven fabric sheets, polypropylene spun bond, polyester-rayon mixed sheets, etc., can be cited.

[0007]

The insect-repelling covers of this invention are made by laying a front sheet wherein an anterior piece and a posterior piece overlap, over a back sheet having the same shape as this. One characteristic they have is that the upper part of said front sheet is configured so that it can be opened and closed. That is, since only the lower end of the overlap of the anterior piece and posterior piece is fused and a portion of the upper overlap is made to be re-sealable with an appropriate sealing means, by opening the seal and spreading the upper part during use, placement of the insect-repellent cover can be easily accomplished without removing hangers hung with cloth from the hanger bar. For sealing means, sealing materials and pins can be cited. Using, for example, sealing materials that display expiration dates is very convenient. Shapes and sizes of insect-repelling covers are optional but those of 50-70 cm width and 100-150 cm length with 5-20 cm wide overlaps are easy to use.

[0008]

Insect-repellent components are included in at least one of the front sheet or back sheet, preferably the back sheet. Although the material of the chemical-containing sheet can be either plastic or nonwoven fabric, nonwoven fabric is more advantageous in terms of production. In including the chemical, gravure printing application, etc., can be suitably used. For example, making the front sheet to be a plastic sheet without chemical and making the back sheet out of a chemical-containing nonwoven fabric is favorable. In this case, to maintain insect-repellent effects over long periods, using nonvolatile insect-repellent components together with highly volatile insect-repellent components is favorable.

[0009]

For insect-repellent components of high volatility that are used in the insect-repelling covers of this invention, pyrethroid insect-repellent components that are volatile at room temperature are ideal. For example, 1-ethynyl-2-methyl-2-pentenyl chrysanthemate (empenethrin), 1-ethynyl-2-fluoro-2-pentenyl 2,2-dimethyl-3-(2,2-dichlorovinyl) cyclopropane-1-carboxylate (Compound A below), 2,3,5,6-tetrafluorobenzyl 2,2-dimethyl-3-(2,2-dichlorovinyl) cyclopropane-1-carboxylate (transfluthrin), 4-methyl-2,3,5,6-tetrafluorobenzyl 2,2-dimethyl-3-(1-propenyl) cyclopropane-1-carboxylate (Compound B below), etc., can be cited. When optical isomerism due to asymmetric carbons or geometric isomerism due to double bonds in the chemical structure are present, the inclusion in this invention of the respective isomers alone as well as optional mixtures is a matter of course. Among the above pyrethroid insect-repellent components, empenethrin is easy to use in terms of insect-repellent effect and ease of procurement.

[0010]

Meanwhile, for the nonvolatile insect-repellent components, phenothrin, cyphenothrin, ethofenprox, silafluofen, etc., can be cited. But silafluofen that is superior in various ways such as insect-repellent effects, safety for humans, and chemical stability over long periods of 1 year or more is particularly preferable. For the initial mixing ratio of pyrethroid insect-repellent components that are volatile at room temperature to non volatile insect-repellent components, 4:1-1:2 is appropriate. At these mixing ratios, it has been seen that the volatilization of the pyrethroid insect-repellent components that are volatile at room temperature is controlled to an appropriate degree. To the extent that the performance of this invention is maintained, other pyrethroid agents can be blended such as allethrin or prallethrin, pest-repellents such as

DEET or dimethyl phthalate, antimicrobial fragrances such as honoki thiol, linalool, citronellol or eugenol, fungicides such as o-phenylphenol, p-chloro-m-xlenol, 3-methyl-4-isopropyl phenol, or allyl isothiocyanate, antimicrobial agents, as well as odor-eliminating agents, fragrances, stabilizers, coloring agents, etc., as appropriate, to make multipurpose insect-repellent sheets.

[0011]

In the insect-repelling covers of this invention, chemical solutions containing the above insect-repellent components are preferably contained in back sheets made of nonwoven fabric. When the amounts contained are, for example, 300 mg/m² for the pyrethroid insect-repellent components that are volatile at room temperature and 200 mg/m² for the nonvolatile insect-repellent components, insect-repellent effects can be maintained against clothes pests such as tineid moths, webbing clothes moths (*Tineola bisselliella* Hum.), black and varied carpet (dermestid) beetles, etc., for about 1 year.

[0012]

The invention of Claim 2 is insect-repelling covers for which in the configuration of Claim 1, the front sheet is made of plastic and the back sheet is made of nonwoven fabric and contains mixtures of pyrethroid insect-repellent components that are volatile at room temperature as well as insect-repellent components that are nonvolatile.

[0013]

The invention of Claim 3 is insect-repelling covers for which in the configuration of Claim 2, emperthrin has been selected as the pyrethroid insect-repellent component that is volatile at room temperature and silafluofen as the nonvolatile insect-repellent component.

[0014]

The invention of Claim 4 is insect-repelling covers for which, in the configurations of any of Claims 1-3, a sealing material has been used as the sealing means installed on a portion of the upper overlap of the front sheet.

[0015]

Such insect-repelling covers of this invention, preferably, insect-repelling covers wherein the front sheet is made of plastic, and the back sheet is made of nonwoven fabric and contains mixtures of pyrethroid insect-repellent components that are volatile at room temperature and insect-repellent components that are nonvolatile, are easy to use because they can be placed over clothes such as suits and dresses while hung on hanger bars. They also excel in terms of insect-repellent effects over long periods and producibility and they are highly usable.

[0016]

Application example

Next, the insect-repelling covers of this invention will be explained in further detail, referring to the figures, based on a concrete application example as well as test examples. Figure 1 is an application example of the insect-repelling covers of this invention. Figure 2 shows a reference oblique view of the cover placed on clothes.

[0017]

Application Example 1

A polypropylene anterior piece (1) of about 35 cm width and 140 cm length and a polypropylene posterior piece (2) of the same shape were overlaid so that the width of the overlap (4) would be about 10 cm and a 60 cm wide, 140 cm long front sheet (3) was formed. Meanwhile, a polypropylene spun bond (nonwoven fabric) back sheet (5) of the same shape as front sheet (3) and containing empenethrin and silafluofen in proportions of 300 mg/m² and 200 mg/m², respectively, as insect-repellent components was made. The two sheets were laid atop each other and the side edges (6) and bottom edge (7) of the two sheets were fused. Meanwhile, the upper edge (about 12 cm) including the upper ends of the overlap (4) was opened to obtain the insect-repellent cover of this invention. By making overlap (4) in the upper part of front sheet (3) to open in the front when using the insect-repellent cover of this invention, the insect-repellent cover can be placed over a dress without removing the hanger hung with the dress from the hanger bar. After this, overlap (4) was returned to its original state and a portion of overlap (4) was sealed using expiration date-displaying sealing material (8). Such an insect-repellent cover of this invention excelled in convenience and maintained insect-repellent effects for 1 year or more due to the effects of the mixed insect-repellent components.

[0018]

Test Example 1

The various kinds of insect-repelling covers shown in Table 1 were made according to Application Example 1 and their performance was tested as follows. Those results are also shown in Table 1.

(1) Usability test

Clothes were hung on hangers and the insect-repelling covers were applied while [the clothes] were hanging on the hanger bar. Results are shown with ratings of O, Δ and X, in order of ease of application.

(2) Damage-prevention test

Clothes were hung on hangers, various kinds of insect-repelling covers were applied and these were stored inside closets. 1 year later, 5 tineid moths were released on the clothes in the insect-repelling covers and the damage of clothes over 1 week was observed. The results of damage were evaluated according to the following standards.

O: Absolutely no damage.

Δ: Some damage visible.

X: Damage visible.

TABLE 1

		1 2 3 4 5 6 7							
		2	3	4	5	6	7	8	9
		1	2	3	4	5	6	7	8
10	1	1	2	3	4	5	6	7	8
	2	1	2	3	4	5	6	7	8
	3	1	2	3	4	5	6	7	8
	4	1	2	3	4	5	6	7	8
11	1	1	2	3	4	5	6	7	8
	2	1	2	3	4	5	6	7	8
	3	1	2	3	4	5	6	7	8
	4	1	2	3	4	5	6	7	8

- Key: 1 Inset-repelling covers
- 2 Configuration
- 3 Front sheet
- 4 Material
- 5 Insect-repellent component mg/m^3
- 6 Back sheet
- 7 Performance tests
- 8 Usability
- 9 Insect-repellence
- 10 This invention
- 11 Control
- 12 Upper end of overlap open, front-opening

- Same as above
- Same as above
- Same as above
- 13 Clothes taken in and out from lower edge
Lower edge open, front-opening
- 14 Compound A 400
- 15 PP spun bond
PET-rayon
PET-rayon
PP spun bond
- 16 PP spun bond
PP spun bond
- 17 Empenthrin 300, silafluofen 200
Transfluthrin 350, cyphenothrin 100
Compound B 350, ethofenprox 250
- 18 Empenthrin 400
Empenthrin 300, silafluofen 200

[0020]

As a result of the tests, the insect-repelling covers of this invention were easy to use and showed superior insect-repellent effects over long periods. Those that used mixtures of highly volatile insect-repellent components with nonvolatile insect-repellent components for the insect-repellent components were more preferable. In contrast to this, with the previous products used as the controls, for

example, the insect-repellent cover that did not have a front-opening configuration and had an open bottom edge (hem) (Control 1), when applying the insect-repellent cover, it was always necessary to remove the hangers hung with clothes from the hanger bar, which was tedious. The insect-repellent cover that did not fuse the front sheet and back sheet (Control 2) lacked enclosure and was not able to maintain insect-repellent effects over long periods.

[0021]

Effects of the invention

This invention presents highly convenient insect-repelling covers that can be placed on clothes without removing hangers hung with clothes from the hanger bar. Insect-repelling covers with front sheets made of plastic, and back sheets made of nonwoven fabric that contain mixtures of pyrethroid insect-repellent components that are volatile at room temperature and insect-repellent components that are nonvolatile are especially favorable because they have better insect-repellent effects over long periods and better producibility.

Brief description of the figures

Figure 1 is an application example of the insect-repelling covers of this invention.

Figure 2 is a reference oblique view when of this applied on clothes hung on hangers.

Explanation of symbols

- 1 Anterior piece
- 2 Posterior piece
- 3 Front sheet

- 4 Overlap
- 5 Back sheet
- 6 Side edge
- 7 Bottom edge
- 8 Sealing material

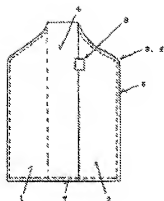


Figure 1

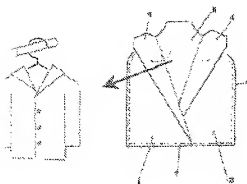


Figure 2